Claims:

1. A method of processing a flowable solid material that includes at least one low volatility, water-reactive metal chloride, the method comprising:

combining a flowable solid material that includes at least one low volatility, water-reactive metal chloride with a powdered hydrate to provide a mixture;

heating the mixture at a temperature greater than 80° such that a low volatility, water-reactive metal chloride in the flowable solid material reacts with the hydrate; and

discharging the resulting mixture for disposal or metals recovery.

2. A method of claim 1 wherein the heating is carried out with the mixture further comprising milled sodium chloride.

3. The method of claim 1 wherein the power material contains at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.

4. The method of claim 1 wherein the flowable solid material is from the production of chlorosilanes.

5. The method of claim 1 wherein the flowable solid material is from the production of methylchlorosilanes.

6. The method of claim 1 wherein the flowable solid material is from the production of titanium chloride.

7. The method of claim 1 wherein the flowable solid material is from the production of hafnium and zirconium chloride.

8. A method of processing the residue from a chlorosilane manufacturing process, the method comprising:

concentrating a residue mixture containing volatile chlorosilanes and lower volatility components including at least one water-reactive metal chloride in a drier unit suitable for processing a solid fraction;

separating volatile chlorosilane vapors from the mixture;

contacting the remaining substantially chlorosilane-free solid residue with a hydrate at a temperature greater than 80° such that the at least one water-reactive metal chloride reacts with the hydrate; and

discharging the resulting powder mixture.

9. The method of claim 8 further comprising contacting the substantially chlorosilane-free solid residue with an alkaline salt to increase the pH of the resulting powder mixture.

10. The method of claim 8 further comprising, simultaneously:

contacting the remaining substantially chlorosilane-free solid residue with a hydrate; and

contacting the remaining substantially chlorosilane-free solid residue with the alkaline salt.

11. The method of claim 10 wherein the contacting of the remaining substantially chlorosilane-free solid residue with a hydrate and the contacting of the remaining substantially chlorosilane-free solid residue with the alkaline salt is accomplished by contacting of the remaining substantially chlorosilane-free solid residue with mechanically refined trona, which is a natural form of sodium sesquicarbonate, is a hydrated mineral, and provides an alkaline salt.

12. The method of claim 8 wherein:

the alkaline salt comprises calcium carbonate; and

the hydrate comprises damp natural soil.

13. The method of claim 8 wherein:

the alkaline salt comprises magnesium hydroxide; and

the hydrate comprises montmorillonite clay.

14. The method of claim 8 wherein the residue mixture contains at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.

15. A method of processing the residue from a chlorosilane manufacturing process, the method comprising:

concentrating a residue mixture containing volatile chlorosilanes and lower volatility components including at least one water-reactive metal chloride in a drier unit that is suitable for processing a solid fraction in the presence of finely milled sodium chloride;

separating volatile chlorosilane vapors from the mixture in the drier unit;

contacting the remaining substantially chlorosilane-free solid residue with a hydrate in the drier unit at a temperature greater than 80° such that the at least one water-reactive metal chloride reacts with the hydrate; and

discharging the resulting powder mixture from the drier unit.

16. The method of claim 15 further comprising contacting the substantially chlorosilane-free solid residue with an alkaline salt to increase the pH of the resulting powder mixture.

17. The method of claim 16 further comprising simultaneously contacting the remaining substantially chlorosilane-free solid residue with a hydrate and contacting the remaining substantially chlorosilane-free solid residue with the alkaline salt.

18. The method of claim 17 wherein the contacting of the remaining substantially chlorosilane-free solid residue with a hydrate and the contacting of the remaining substantially chlorosilane-free solid residue with the alkaline salt is accomplished by contacting of the remaining substantially chlorosilane-free solid

residue with trona, which is a natural form of sodium sesquicarbonate, is a hydrated mineral, and provides an alkaline salt.

19. The method of claim 15 wherein:
the alkaline salt comprises calcium carbonate; and
the hydrate comprises damp natural soil.

20. The method of claim 15 wherein:
the alkaline salt comprises magnesium hydroxide; and
the hydrate comprises montmorillonite clay.

21. The method of claim 15 wherein the at least one metal chloride is at least one metal chloride selected from the group consisting of aluminum chloride, titanium chloride, vanadium chloride, chromium chloride, manganese chloride, iron chloride, cobalt chloride, nickel chloride, copper chloride, and zinc chloride.